

## **Rationale for Compound Selection for Reduced Hazardous Air Pollutant (HAP) List**

Source Category: Combustion Turbines (digester gas fired)

### A. Source of information used in the development of reduced HAP list table

The attached target list of 7 HAPs, emitted from combustion turbines burning digester gas at Publicly Owned treatment Works, was prepared based on: 1) California experience with toxic air regulations such as AB 2588 and, 2) Actual source test results. These two approaches are briefly described in the following.

1. In California, the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) was implemented on June 1, 1989. This law requires facilities with air toxic emissions to self report emissions in order to determine if "hot spots" exist in the state.

To comply with the requirements of AB 2588 at wastewater treatment plants, the City of Los Angeles (CLA) developed a reduced list of 16 compounds for quantification and reporting purpose. AB 2588 requires quantification of over 150 compounds if they are emitted at a reporting facility in excess of "quantification threshold" in pounds per year. For preparing the reduced or "target list" of 16 compounds for the combustion sources, CLA used historical influent monitoring at the plant, data on VOC found from other POTWs, pooled emission estimation program (PEEP), and literature. In addition, ducted headworks were source tested for air and liquid samples collected at the plant infl

2. The HAP list was reduced further from 16 to 7 compounds after review of actual source test results and identifying compounds found in significant quantities above the detection levels. Most of the source testings were performed to comply with air toxics regulations such as AB2588.

### B. Rationale for the exclusion codes and number of compounds included in the reduced HAP list table

For preparation of a reduced HAP list for the digester gas fired combustion turbines, compounds were excluded based on following exclusion codes:

- 1- Compound is not expected to be emitted from source because basic chemical or physical principles do not favor its existence in source exhaust.
- 2- Existing test data indicate that compound is not emitted in significant quantities from source.
- 3- Other
- 4- Compounds not expected to be emitted from POTW sources based on CLA (1991) and PEEP (1990) target lists.

The attached draft list of HAPs and Test Methods for digester gas turbines is an attempt to produce a more manageable list for the review of the CT SWG. It is hoped that latter will find the reduced HAP list useful in setting cost-effective national MACT standards.

If you have any questions concerning in the table, please contact Farhana Mohamed, the TMPWG member who developed the attached table.

### C. References

- a) City of Los Angeles, Department of Public Works, Bureau of Sanitation. (1991) Final Emissions Inventory Report, City of Los Angeles Air Toxics Program, AB 2588 - Air Toxics "Hot Spots" Information and Assessment Act of 1987, Hyperion Treatment Plant, Playa del Rey, CA.
- b) Joint Power Agencies for Pooled Emission Estimation Program. (1990) Final Report for POTWs on Air Toxics "Hot Spots" Information and Assessment Act of 1987.
- c) Sanitation Districts of Los Angeles County. (1991) Report for AB 2588 - Air Toxics "Hot Spots" information and Assessment Act of 1987, Joint Water Pollution Control Plant, Carson, CA.

## HAPS Selection and Test Methods for Source Category

Source Category: Combustion Turbines (digester gas fired)

### Instructions:

Place an "x" in column A for each compound which should be included in the list of applicable compounds for the source category. Then, enter the appropriate test method(s) in column E for each of the included compounds.

For compounds which should be excluded from the list, leave column A blank. Then, enter an explanation for their exclusion in column D. A list of exclusion codes is included to simplify this procedure.

### Exclusion Codes:

- 1 - Compound is not expected to be emitted from source because basic chemical or physical principles do not favor its existence in source exhaust.
- 2 - Existing test data indicate that compound is not emitted in significant quantities from source.
- 3 - Other (Specify)
- 4 - Compounds not expected to be emitted from POTW. Sources based on EPA/AMSA (1995) and PEEP (1990) target lists.
- 5 - Other (Specify)
- 6 - Other (Specify)

Inclu de in	CAS No.	Chemical name	If excluded, give reason for	If Included, give applicable test
x	7507 0	Acetaldehyde		CARB 430
	6035 5	Acetamide	2,4	
	7505 8	Acetonitrile	2,4	
	9886 2	Acetophenone	2,4	
	5396 3	2-Acetylaminofluorene	2,4	
	1070 28	Acrolein	2	
	7906 1	Acrylamide	2,4	

	7910 7	Acrylic acid	2,4	
	1071 31	Acrylonitrile	2,4	
	1070 51	Allyl chloride	2,4	
	9267 1	4-Aminobiphenyl	2,4	
	6253 3	Aniline	1,2,4	
	9004 0	o-Anisidine	1,2,4	
	1332 214	Asbestos	1,2,4	
x	7143 2	Benzene		EPA TO-14/CARB 422
	9287 5	Benzidine	2,4	
	9807 7	Benzotrichloride	2,4	
	1004 47	Benzyl chloride	2,4	
	9252 4	Biphenyl	2,4	
	1178 17	Bis(2-ethylhexyl)phthalate (DEHP)	2,4	
	5428 81	Bis(chloromethyl)ether	2,4	
	7525 2	Bromoform	2,4	
	1069 90	1,3-Butadiene	2	
	1566 27	Calcium cyanamide	1,2,4	
	1330 62	Captan	2,4	
	6325 2	Carbaryl	2,4	
	7515 0	Carbon disulfide	2	

5623 5	Carbon tetrachloride	2	
4635 81	Carbonyl sulfide	2,4	
1208 09	Catechol	2,4	
1339 04	Chloramben	2,4	
5774 9	Chlordane	2,4	
7782 505	Chlorine	2,4	
7911 8	Chloroacetic acid	2,4	
5322 74	2-Chloroacetophenone	2,4	
1089 07	Chlorobenzene	2,4	
5101 56	Chlorobenzilate	1,2,4	
6766 3	Chloroform	2	
1073 02	Chloromethyl methyl ether	2,4	
1269 98	Chloroprene	2	
1319 773	Cresols/Cresylic acid (isomers and mixture)	2,4	
9548 7	o-Cresol	2,4	
1083 94	m-Cresol	2,4	
1064 45	p-Cresol	2,4	
9882 8	Cumene	2	
9475 7	2,4-D, salts and esters	2,4	
3547 044	DDE	2,4	

3348 83	Diazomethane	2,4	
1326 49	Dibenzofurans	2,4	
9612 8	1,2-Dibromo3-chloropropane	2,4	
8474 2	Dibutylphthalate	2,4	
1064 67	1,4-Dichlorobenzene(p)	2	
1239 11	1,4-Dioxane	2	
9194 1	3,3-Dichlorobenzidene	1,2,4	
1114 44	Dichloroethyl ether (Bis(2-chloroethyl)ether)	2,4	
5427 56	1,3-Dichloropropene	2,4	
6273 7	Dichlorvos	1,2,4	
1114 22	Diethanolamine	2,4	
1216 97	N,N-Diethyl aniline (N,N-Dimethylaniline)	2,4	
6467 5	Diethyl sulfate	2,4	
1199 04	3,3-Dimethoxybenzidine	2,4	
6011 7	Dimethyl aminoazobenzene	2,4	
1199 37	3,3--Dimethyl benzidine	2,4	
7944 7	Dimethyl carbamoyl chloride	2,4	
6812 2	Dimethyl formamide	2,4	
5714 7	1,1-Dimethyl hydrazine	2,4	
1311 13	Dimethyl phthalate	2,4	

	7778 1	Dimethyl sulfate	2,4	
	5345 21	4,6-Dinitro-cresol, and salts	2,4	
	5128 5	2,4-Dinitrophenol	2,4	
	1211 42	2,4-Dinitrotoluene	2,4	
	1226 67	1,2-Diphenylhydrazine	2,4	
	1068 98	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	2,4	
	1068 87	1,2-Epoxybutane	2,4	
	1408 85	Ethyl acrylate	2,4	
	1004 14	Ethyl benzene	2	
	5179 6	Ethyl carbamate (Urethane)	2,4	
	7500 3	Ethyl chloride (Chloroethane)	2,4	
	1069 34	Ethylene dibromide (Dibromoethane)	2,4	
	1070 62	Ethylene dichloride (1,2-Dichloroethane)	2	
	1072 11	Ethylene glycol	2,4	
	1515 64	Ethylene imine (Aziridine)	2,4	
	7521 8	Ethylene oxide	2,4	
	9645 7	Ethylene thiourea	2,4	
	7534 3	Ethylidene dichloride (1,1-Dichloroethane)	2,4	
x	5000 0	Formaldehyde		CARB 430
	7644 8	Heptachlor	2,4	

1187 41	Hexachlorobenzene	2,4	
8768 3	Hexachlorobutadiene	2,4	
7747 4	Hexachlorocyclopentadiene	2,4	
6772 1	Hexachloroethane	2,4	
8220 60	Hexamethylene-1,6-diisocyanat e	2,4	
6803 19	Hexamethylphosphoramide	2,4	
1105 43	Hexane	2,4	
3020 12	Hydrazine	2,4	
7647 010	Hydrochloric acid	2,4	
7664 393	Hydrogen fluoride (Hydrofluoric acid)	2,4	
7783 064	Hydrogen sulfide	2,4	
1233 19	Hydroquinone	2,4	
7859 1	Isophorone	2,4	
5889 9	Lindane (all isomers)	2,4	
1083 16	Maleic anhydride	2,4	
6756 1	Methanol	2,4	
7243 5	Methoxychlor	2,4	
7483 9	Methyl bromide (Bromomethane)	2,4	
7487 3	Methyl chloride (Chloromethane)	2	
7155 6	Methyl chloroform (1,1,1-Trichloroethane)	2	

	7893 3	Methyl ethyl ketone (2-Butanone)	2	
	6034 4	Methyl hydrazine	2,4	
	7488 4	Methyl iodide (Iodomethane)	2	
	1081 01	Methyl isobutyl ketone (Hexone)	2	
	6248 39	Methyl isocyanate	2,4	
	8062 6	Methyl methacrylate	2,4	
	1634 044	Methyl tert butyl ether	2	
	1011 44	4,4-Methylene bis(2-chloroaniline)	2,4	
x	7509 2	Methylene chloride (Dichloromethane)		EPA TO-14/CARB 422
	1016 88	Methylene diphenyl diisocyanate (MDI)	2,4	
	1017 79	4,4--Methylenedianiline	2,4	
	9120 3	Naphthalene	2,4	
	9895 3	Nitrobenzene	2,4	
	9293 3	4-Nitrobiphenyl	2,4	
	1000 27	4-Nitrophenol	2,4	
	7946 9	2-Nitropropane	2,4	
	6849 35	N-Nitroso-Nmethylurea	2,4	
	6275 9	N-Nitrosodimethylamine	2,4	
	5989 2	N-Nitrosomorpholine	2,4	
	5638 2	Parathion	1,2,4	

8268 8	Pentachloronitrobenzene (Quintobenzene)	1,2,4	
8786 5	Pentachlorophenol	2,4	
1089 52	Phenol	2,4	
1065 03	p-Phenylenediamine	2,4	
7544 5	Phosgene	2,4	
7803 512	Phosphine	2,4	
7723 140	Phosphorus	2,4	
8544 9	Phthalic anhydride	2,4	
1336 363	Polychlorinated biphenyls (Aroclors)	2,4	
1120 714	1,3-Propane sultone	2,4	
5757 8	beta-Propiolactone	2,4	
1233 86	Propionaldehyde	2,4	
1142 61	Propoxur (Baygon)	1,2,4	
7887 5	Propylene dichloride (1,2-Dichloropropane)	2,4	
7556 9	Propylene oxide	2,4	
7555 8	1,2-Propylenimine (2-Methyl aziridine)	2,4	
9122 5	Quinoline	2,4	
1065 14	Quinone	2,4	
9609 3	Styrene oxide	2,4	
1746 016	2,3,7,8-Tetrachlorodibenzo-p-di oxin	1,2,4	

x	1271 84	Tetrachloroethylene (Perchloroethylene)		EPA TO-14/CARB 422
	7550 450	Titanium tetrachloride	1,2,4	
	1004 25	Styrene	2	
x	1088 83	Toluene		EPA TO-14/CARB 422
	9580 7	2,4-Toluene diamine	2,4	
	5848 49	2,4-Toluene diisocyanate	2,4	
	9553 4	o-Toluidine	2,4	
	8001 352	Toxaphene (chlorinated camphene)	2,4	
	1208 21	1,2,4-Trichlorobenzene	2	
	7900 5	1,1,2-Trichloroethane	2,4	
	7901 6	Trichloroethylene	2	
	9595 4	2,4,5-Trichlorophenol	2,4	
	8806 2	2,4,6-Trichlorophenol	2,4	
	1214 48	Triethylamine	2,4	
	1582 098	Trifluralin	1,2,4	
	5408 41	2,2,4-Trimethylpentane	2,4	
	1080 54	Vinyl acetate	2	
	5936 02	Vinyl bromide	2,4	
	7501 4	Vinyl chloride	2	
	7535 4	Vinylidene chloride (1,1-Dichloroethylene)	2	

x	1330 207	Xylenes (isomers and mixture		EPA TO-14/CARB 422
	9547 6	o-Xylenes	2	
	1083 83	m-Xylenes	2	
	1064 23	p-Xylenes	2	
	N/A	Antimony Compounds	1,2,4	
	N/A	Arsenic Compounds (inorganic including arsine)	1,2,4	
	N/A	Beryllium Compounds	1,2,4	
	N/A	Cadmium Compounds	1,2,4	
	N/A	Chromium Compounds	1,2,4	
	N/A	Cobalt Compounds	1,2,4	
	N/A	Coke Oven Emissions	1,2,4	
	N/A	Cyanide Compounds *1	1,2,4	
	N/A	Glycol ethers *2	1,2,4	
	N/A	Lead Compounds	1,2,4	
	N/A	Manganese Compounds	1,2,4	
	N/A	Mercury Compounds	1,2,4	
	N/A	Fine mineral fibers *3	2,4	
	N/A	Nickel Compounds	1,2,4	
	N/A	Polycyclic Organic Matter *4	2,4	
	N/A	Radionuclides (including radon) *5	1,2,4	
	N/A	Selenium Compounds	1,2,4	
			188	